4.5 Network Interface Table (IS-93 Section 4.3)

Table 1: Network Interface Types

Interface Type	Description	Signaling Method	Key Signaling Information
POI-T1 POI-T2 (for further study) POI-T3 (for further study)	Trunk with Line Treatment (TWLT)	MF BRI (for further study) PRI (for further study)	Called Number
POI-T4 POI-T5 & POI-S5	General Trunk Access	MF ISUP	Called Number Charge Number Originating Line Information Carrier Identification
POI-T6 POI-T7 & POI-S7	Direct Trunk Access	MF ISUP	Called Number
POI-T8 ~~(for further study)~~ POI-T9 & POI-S9 ~~(for further study)~~	Emergency Services Access ~~(for further study)~~	MF (to Emergency Services Network Element ~~Emergency Services Tandem, ESAP~~) ISUP (to Emergency Services Network Element~~Emergency Services Tandem, ESAP~~)	~~ESAP Identification~~ ES Routing Digits Subscriber Identification
...	...	...	...

4.6 Emergency Services Access (IS-93 Section 4.4.4)

Emergency Services Access signaling allows a wireless network element to access emergency services for emergency calls (e.g., fire, police, ambulance, etc.). Either side of the interface may provide the routing, bridging, and transfer functionality, so the Emergency Services Network Element accessed may be either a selective router (S/R) or a Public Safety Answering Point (PSAP). This interface is not symmetrical, so calls from emergency services appear as normal incoming calls.

~~Emergency Services Access signaling allows a cellular network element to directly access an emergency services tandem or Emergency Services Access Point (ESAP). The emergency services tandem routes emergency calls (e.g., fire, police, ambulance, etc.) to an ESAP. A directly connected ESAP arrangement can be used where high volume emergency traffic is anticipated. Connections that are made to the ESAP are optionally controlled by the ESAP regardless of the action of the calling party. For example, an interconnection to an ESAP via the POI-T8, POI-T9 or POI-S9 interfaces is characterized by special use of disconnect control signaling.~~ The key signaling information elements included in the address signaling sequence to obtain access to emergency services should be the following:

- ~~ESAP identification (to select the appropriate ESAP);~~
- subscriber location (indirectly able to select the appropriate PSAP) and;
- subscriber identification.

Emergency Services Access signaling is provided via the following interface types:

- POI-T8 (MF);
- POI-T9 and POI-S9 (ISUP).

The POI-T8 interface uses inband MF signaling. This interface provides access to ~~services that are provided by the~~ emergency services ~~tandem or PSAP~~ ESAP ~~only~~.

The POI-T9 and POI-S9 interfaces use SS7 ISUP protocol signaling. The POI-S9 interface is used to control emergency calls ~~user traffic~~ transferred across the POI-T9 interface. ISUP messages are used to establish and release the SS7 supported trunks and to provide supplementary ISDN services.

~~The specification of the POI-T8, POI-T9 and POI-S9 interfaces is for further study. Refer to annex A – Emergency Services Models for the emergency services access models under study.~~

4.7 Transaction Capabilities Application Part (TCAP) - SS7 (IS-93 Section 4.5.7)

The Transaction Capabilities Application Part of SS7 provides signaling across the POI-S interface. The TCAP interface provides transaction capabilities between application layer entities. Transaction capabilities provide operations for the transfer of non-circuit related information between SS7 network nodes (SPs) and provide generic services to applications, while being independent of those services. The TCAP protocol requires the SCCP and the MTP as the underlying layers for SS7.

The following ~~information is~~ agreements are required for the TCAP interfaces:

- **Operation Family**;
- **Operation Set**;
- **TCAP Version** (e.g., ~~i.e.,~~ ANSI revision or ITU-T ~~CCITT~~ revision);
- **Supported Nodes** (i.e., Service Switching Point or Service Control Point);
- **Application Address** (i.e., Point Code and SSN or Global Title Address).

Additional signaling information provided by TCAP is specified in the *ANSI T1.114* or the ITU-T ~~CCITT~~ *Q.771 - Q.775* specifications of SS7 (see Section 2 - References).

4.8 Emergency Services Signaling (IS-93 Section X) ***NEW***

4.8.1 ANI II Digits Selection ***NEW***

The ANI II information digits are used to identify the type of ANI digits passed across an interface. The use of ANI and ANI II is subject to the type of network interconnection. See *IS-93* for details about specific network interconnection types.

This section may be moved to *IS-93* in the future.

The specific meaning of any ANI II digits is subject to bilateral agreement between the operators of a network interconnection.

a. The call is a call delivery leg and the responsible party is identified by the ANI

Use ANI II digits 63. The called address is restricted and should not be presented to the subscriber or the called party (e.g., should not be presented on the subscriber's bill). The restriction holds for both the duration of the call and for any subsequent billing or call detail information.

The ANI information reflects the identity of the responsible party for the call delivery. This is usually the called subscriber.

b. The responsible party cannot be uniquely identified by the ANI

Use ANI II digits 61 (also see item c). In this case the ANI reflects the cellular service provider originating the call and the originating location.

This may indicate that the cellular service provider is using a POI-T1 interconnection and it may, therefore, also include call delivery legs in other interconnections.

c. The responsible party is not authorized for additional services[1]

Use ANI II digits 61 (also see item b). In this case the ANI reflects the identity of the responsible party which is usually the calling party. The ANI does not necessarily reflect the calling location of the subscriber making the call.

d. The responsible party is uniquely identified by the ANI and may be authorized for certain additional services

Use ANI II digits 62. The ANI reflects the identity of the responsible party which is usually the calling party. The ANI does not necessarily reflect the calling location of the subscriber making the call.

Any additional services that may be provided are subject to bilateral agreement between the operators of a network interconnection. Such services include, but are not limited to, directory assistance call completion, operator extended call and operator assisted call.

[1] The use of this value is currently under industry forum review and is subject to change.

4.8.2 POI-T8 (MF) Interface Signaling Scenarios (IS-93 Section X.1) ***NEW***

Table 12A: POI-T8 Signaling Information Field Contents

Call Type	1st Stage Address Field	2nd Stage Identification and Address Fields
Emergency Services Direct Call with ANI only	KP + (II + ANI) + ST1P	None
Emergency Services Direct Call with location and ANI	KP + (II + ANI) + ST + KP + 7/10D + ST	None

Notes:

1. The 7/10D in this table is encoded with the base station, cell site or sector identification. It may be a routable number to allow it to pass through intervening networks.

2. The ANI in this table is encoded with the calling party's Mobile Directory Number or Mobile Station ISDN number, instead of the calling party's charge number. This number identifies the calling party and may be used as a callback number for the calling party. If a 10-digit NANP callback number is not available, a default number may be used.

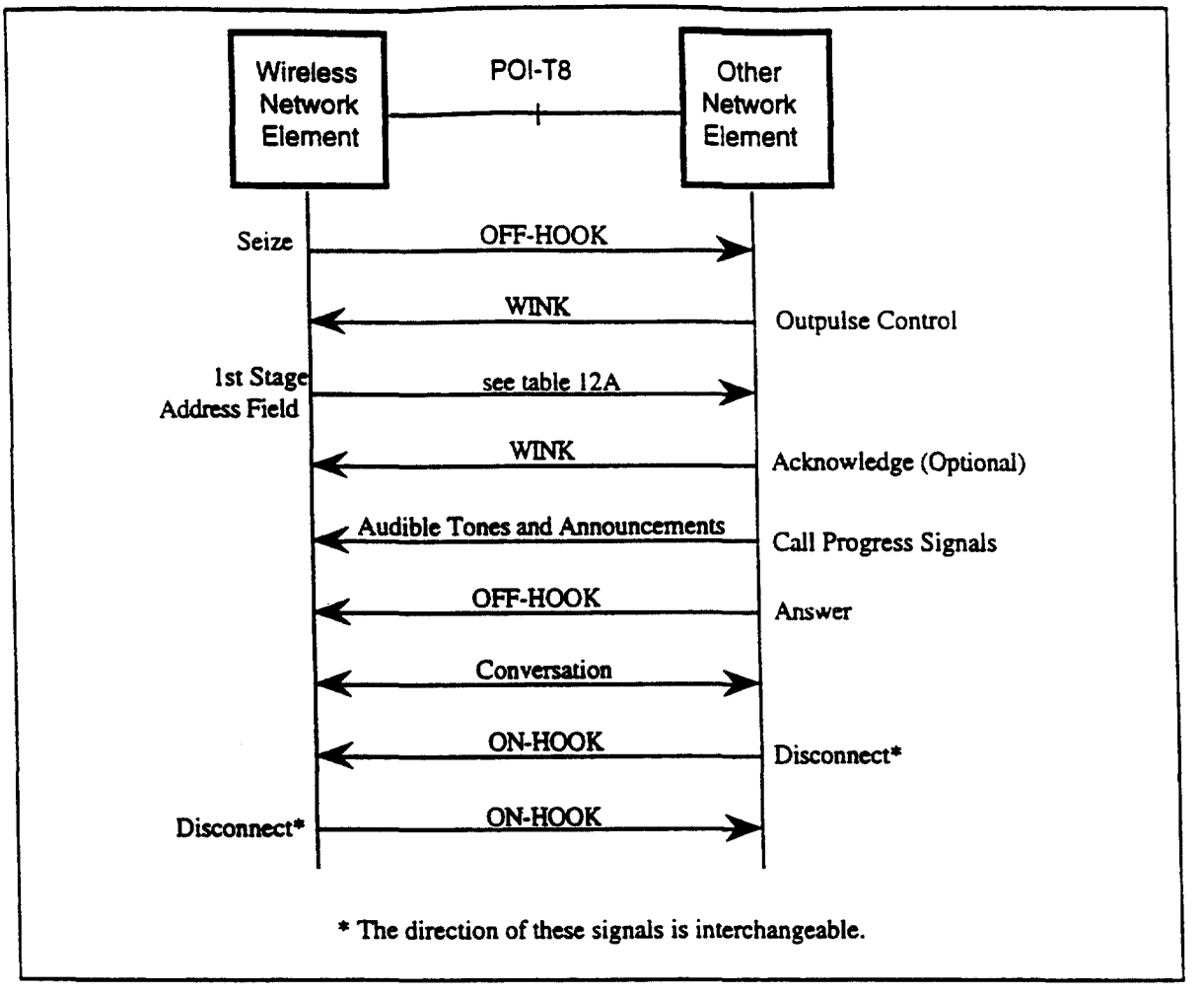

Figure 13A: POI-T8 Interface Signaling Scenario - Wireless Network Origination (Direct Connection)

4.8.3 POI-T9 and POI-S9 (ISUP) Interface Signaling Scenarios (IS-93 Section X.2) ***NEW***

Table 12B: POI-S9 Signaling Information Field Contents

Call Type	ISUP IAM Parameters	ANSI T1.113.3 Reference Section
Emergency Services Direct Call	Message Type	Section 1.3
	Nature of Connection Indicators	Section 3.24
	Forward Call Indicators	Section 3.20
	Calling Party's Category (= emergency service call)	Section 3.8
	Calling Party Number (= callback number up to 15D)	Section 3.7 (See Notes)
	User Service Information	Section 3.33
	Called Party Number (4-10D)	Section 3.6 (See Notes)
	Generic Digits Parameters	(See Notes)
Emergency Services Direct Call (contiguous signaling, indirect IC connection)	Message Type	Section 1.3
	Nature of Connection Indicators	Section 3.24
	Forward Call Indicators	Section 3.20
	Calling Party's Category (= emergency service call)	Section 3.8
	Calling Party Number (= callback number up to 15D)	Section 3.7 (See Notes)
	User Service Information	Section 3.33
	Called Party Number (7/10D)	Section 3.6 (See Notes)
	Charge Number (e.g., ANI)	Section 3.10
	Originating Line Information (II)	Section 3.26A
	Transit Network Selection (ZZ + CIC)	Section 3.31B
	Generic Digits Parameters	(See Notes)
IC Direct Call	Message Type	Section 1.3
	Nature of Connection Indicators	Section 3.24
	Forward Call Indicators	Section 3.20
	Calling Party's Category (= emergency service call)	Section 3.8
	Calling Party Number (= callback number up to 15D)	Section 3.7 (See Notes)
	User Service Information	Section 3.33
	Called Party Number (7/10D)	Section 3.6 (See Notes)
	Charge Number (e.g., ANI)	Section 3.10
	Originating Line Information (II)	Section 3.26A
	Generic Digits Parameters	(See Notes)
INC Direct (WZ1)	Message Type	Section 1.3
	Nature of Connection Indicators	Section 3.24
	Forward Call Indicators	Section 3.20
	Calling Party's Category (= emergency service call)	Section 3.8
	Calling Party Number (= callback number up to 15D)	Section 3.7 (See Notes)
	User Service Information	Section 3.33
	Called Party Number (10D)	Section 3.6 (See Notes)
	Charge Number (e.g., ANI)	Section 3.10
	Originating Line Information (II)	Section 3.26A
	Transit Network Selection (CIC)	Section 3.31B
	Generic Digits Parameters	(See Notes)

Notes:

1. The MTP message priority for IAM messages is set according to *T1.111*.

Information Carried	ISDN-UP Parameter
Routing Number or called number to select an ESNE based on S/R, PSAP, base station, cell site, or sector.	Called Party Number
Callback Number (if not available, a default number may be used)	Calling Party Number
Base Station, Cell Site or Sector Identifier	Generic Digits Parameter (type of digits 01101) as reserved by T1S1.3

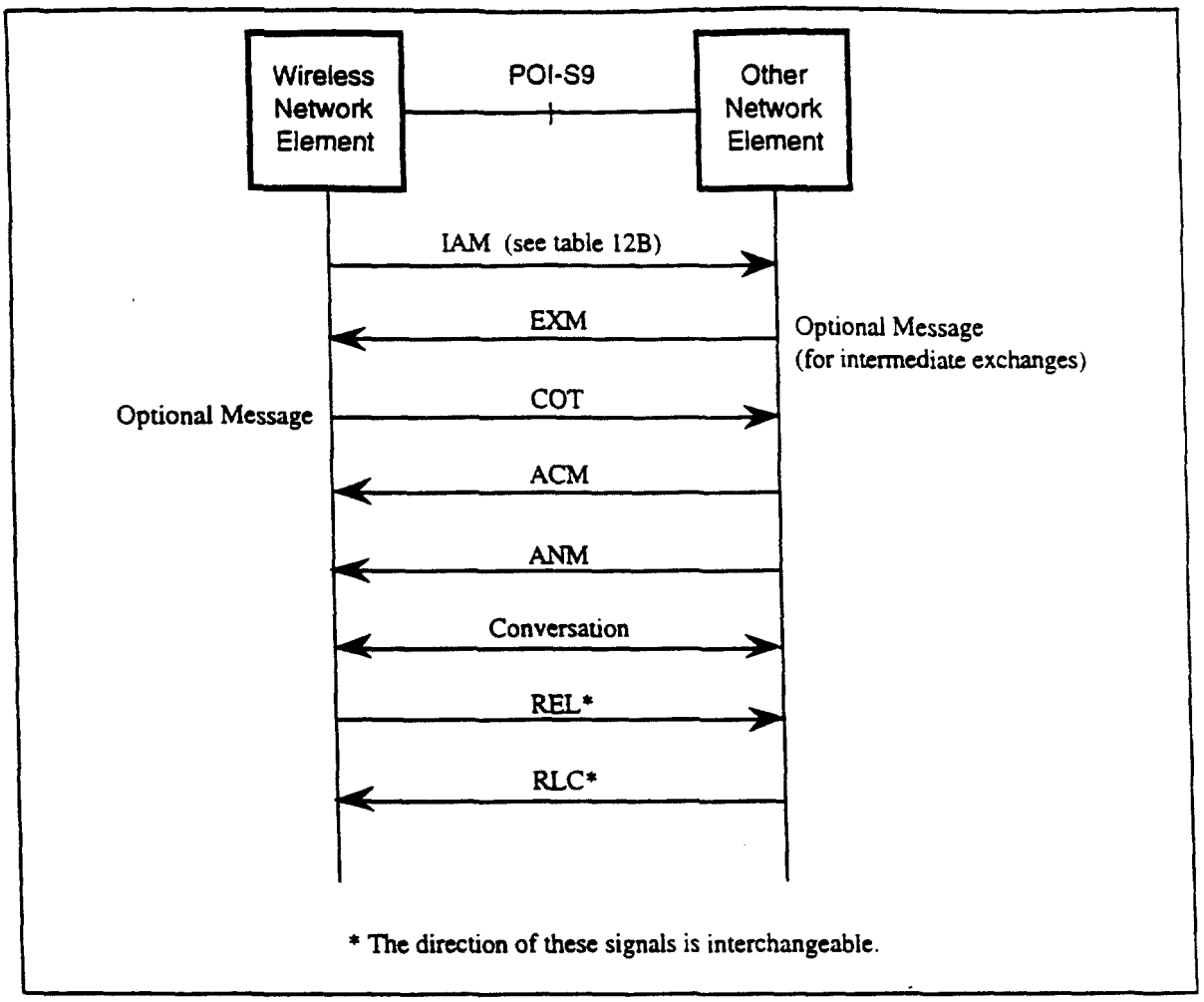

Figure 13C: POI-S9 Interface Signaling Scenario - Wireless Network Originated

4.8.4 Annex A - Emergency Services Models

This annex has been superceded. See POI-T8, POI-T9, and POI-S9.

WIRELESS ENHANCED EMERGENCY SERVICES:
TIA/EIA-41 STAGE 3 MODIFICATIONS

CONTENTS

LIST OF FIGURES

None.

LIST OF TABLES

FOREWORD

This Foreword is not part of this Interim Standard.

This is one of a series of recommendations titled

"WIRELESS ENHANCED EMERGENCY SERVICES"

which provides a solution for the limited capabilities of Wireless Enhanced Emergency Services. These capabilities include:

- provision of base station, cell site or sector identification information
- subscriber identification
- callback
- reconnect

The recommendations included in this series are:

- J-STD-034.1, Wireless Enhanced Emergency Services: Functional Overview
- J-STD-034.2, Wireless Enhanced Emergency Services: PSAP Perspective
- J-STD-034.3, Wireless Enhanced Emergency Services: Emergency Services Stage 2
- J-STD-034.4, Wireless Enhanced Emergency Services: *TIA/EIA-41* Intersystem Handoff Modifications
- J-STD-034.5, Wireless Enhanced Emergency Services: *TIA/EIA-41* Automatic Roaming Modifications
- J-STD-034.6, Wireless Enhanced Emergency Services: *ANSI J-STD-023* Stage 2 Modifications
- J-STD-034.7, Wireless Enhanced Emergency Services: *TIA/EIA/IS-93* Modifications
- J-STD-034.8, Wireless Enhanced Emergency Services: *TIA/EIA-41* Stage 3 Modifications
- J-STD-034.9, Wireless Enhanced Emergency Services: *ANSI J-STD-024* Modifications

REVISION HISTORY

Revision	Date	Remarks
0	October 1997	Initial Publication

NOTE

The unique numbering system assigned to these documents is intended to reflect their hierarchical structure.

1. INTRODUCTION

1.1 OBJECTIVE

This is one of a series of recommendations titled

"WIRELESS ENHANCED EMERGENCY SERVICES"

which provides a solution for the limited capabilities of Wireless Enhanced Emergency Services. These capabilities include:

- provision of base station, cell site or sector identification information
- subscriber identification
- callback
- reconnect

1.2 SCOPE

This document provides a solution for modifications to *TIA/EIA-41* Chapter 5 to support Wireless Enhanced Emergency Services.

1.3 ORGANIZATION

This document is organized by the following sections:

- Section 1, titled "Introduction," provides introductory information for this Interim Standard.
- Section 2, titled "References," lists the normative and informative references for this Interim Standard.
- Section 3, titled "Terminology," lists the definitions, symbols, abbreviations, and other documentation conventions used in this Interim Standard.
- Section 4, titled "*TIA/EIA-41* Stage 3 Modifications," defines the modifications to the intersystem messaging parameters in *TIA/EIA-41* necessary to support Wireless Enhanced Emergency Services.

2. REFERENCES

The *TIA/EIA-41* recommendations are:

- ANSI/TIA/EIA-41, *Cellular Radiotelecommunications Intersystem Operations; 1997.*

3. TERMINOLOGY

3.1 DEFINITIONS

Emergency Services Call

A call requiring connection to a PSAP. The digits 9-1-1 require this treatment in the United States.

3.2 SYMBOLS AND ABBREVIATIONS

ES	Emergency Services
ESRD	EmergencyServicesRoutingDigits parameter
M	Mandatory
O	Optional
SHH	SpecialHandling parameter

4. *TIA/EIA-41* STAGE 3 MODIFICATIONS

6.4.2.12 FacilitiesDirective2

The FacilitiesDirective2 (FACDIR) operation is used to request that the Target MSC initiate the Handoff-Forward task. This operation differs from the FacilitiesDirective operation in its addition of support for CDMA and NAMPS MSs.

The FacilitiesDirective2 operation is initiated with a TCAP INVOKE (LAST). This is carried by a TCAP QUERY WITH PERMISSION package. The Parameter Set is encoded as follows:

Table 33 FacilitiesDirective2 INVOKE Parameters

FacilitiesDirective2 INVOKE Parameters				**Timer: HOT**
Field	**Value**	**Type**	**Reference**	**Notes**
Identifier	SET [NATIONAL 18]	M	6.4.1.2	
Length	variable octets	M	6.4.1.1	
Contents				
BillingID		M	6.5.2.16	
No changes to existing parameters				
SpecialHandling		O	6.5.2.bt	r

Notes:

a..q. No changes to these notes

r. Include if any fields in this parameter are non-zero.

No modifications to RETURN RESULT.

6.4.2.15 FlashRequest

The FlashRequest (FLASHREQ) operation is used to forward a flash received from an MS engaged in a call toward the Anchor MSC (possibly via one or more Tandem MSCs).

The FlashRequest operation is initiated with a TCAP INVOKE (LAST). This is carried by a TCAP QUERY WITH PERMISSION package. The Parameter Set is encoded as follows:

Table 39 FlashRequest INVOKE Parameters

FlashRequest INVOKE Parameters				Timer: FRT
Field	**Value**	**Type**	**Reference**	**Notes**
Identifier	SET [NATIONAL 18]	M	6.4.1.2	
Length	variable octets	M	6.4.1.1	
Contents				
Digits (Dialed)		M	6.5.2.58	a
InterMSCCircuitID		M	6.5.2.72	
MobileIdentificationNumber		M	6.5.2.81	
ConfidentialityModes (Actual)		O	6.5.2.50	b
ElectronicSerialNumber		O	6.5.2.63	
EmergencyServicesRoutingDigits		O	6.5.2.bs	c

Notes:

a. The Digits parameter is sent non-encrypted.

b. Include if the SignalingMessageEncryptionKey parameter was provided to the Serving MSC.

c. Include to specify the location of the MS.

The FlashRequest operation success is reported with a TCAP RETURN RESULT (LAST). This is carried by a TCAP RESPONSE package. The Parameter Set is encoded as follows:

Table 40 FlashRequest RETURN RESULT Parameters

FlashRequest RETURN RESULT Parameters				
Field	**Value**	**Type**	**Reference**	**Notes**
Identifier	SET [NATIONAL 18]	M	6.4.1.2	
Length	variable octets	M	6.4.1.1	
Contents				
SpecialHandling		O	6.5.2.bt	a

Notes:

a. Include if any fields in this parameter are non-zero.

6.4.2.17 HandoffBack2

The HandoffBack2 (HANDBACK2) operation is used by the Serving MSC to request that the Target MSC initiate the Handoff-Back task. This task is used to handoff a call to a Target MSC to which the Serving MSC is already connected, for the call in question, via an inter-MSC trunk. This operation differs from the HandoffBack operation in its addition of support for CDMA and NAMPS MSs.

The HandoffBack2 operation is initiated with a TCAP INVOKE (LAST). This is carried by a TCAP QUERY WITH PERMISSION package. The Parameter Set is encoded as follows:

Table 43 HandoffBack2 INVOKE Parameters

HandoffBack2 INVOKE Parameters				Timer: HOT
Field	**Value**	**Type**	**Reference**	**Notes**
Identifier	SET [NATIONAL 18]	M	6.4.1.2	
Length	variable octets	M	6.4.1.1	
Contents				
BillingID		M	6.5.2.16	
no changes to existing parameters				
SpecialHandling		O	6.5.2.bt	r

Notes:

a..q. no changes

r. Include if any fields in this parameter are non-zero.

6.4.2.21 HandoffToThird2

The HandoffToThird2 (HANDTHIRD) operation is used by the Serving MSC (non-Anchor) to initiate a handoff with path minimization. This operation differs from the HandoffToThird operation in its support of dual-mode CDMA and NAMPS MSs.

The HandoffToThird2 operation is initiated with a TCAP INVOKE (LAST). This is carried by a TCAP QUERY WITH PERMISSION package. The Parameter Set is encoded as follows:

Table 51 HandoffToThird2 INVOKE Parameters

HandoffToThird2 INVOKE Parameters				Timer: HTTT
Field	**Value**	**Type**	**Reference**	**Notes**
Identifier	SET [NATIONAL 18]	M	6.4.1.2	
Length	variable octets	M	6.4.1.1	
Contents				
BillingID		M	6.5.2.16	
no changes to existing parameters				
SpecialHandling		O	6.5.2.bt	q

Notes:

a..p. no changes

q. Include if any fields in this parameter are non-zero.

No modifications to RETURN RESULT.

6.5.1.2 Parameter Identifiers

The following table lists the *TIA/EIA-41* MAP Parameter Identifiers.

Table 118 *TIA/EIA-41* MAP Parameter Identifiers

Parameter Identifier Name	Parameter Identifier Code H G F E D C B A	Reference
BillingID	1 0 0 0 0 0 0 1	6.5.2.16
ServingCellID	1 0 0 0 0 0 1 0	6.5.2.117
	. . .	
EmergencyServicesRoutingDigits	1 0 0 1 1 1 1 1 1 0 0 0 0 0 0 1 0 1 1 1 0 0 0 0	6.5.2.bs
SpecialHandling	1 0 0 1 1 1 1 1 1 0 0 0 0 0 0 1 0 1 1 1 0 0 0 1	6.5.2.bt

6.5.2.bs EmergencyServicesRoutingDigits ***NEW***

The EmergencyServicesRoutingDigits (ESRD) parameter is a BCD digit string identifying a base station, cell site or sector.

Field	Value	Type	Reference	Notes
Identifier	EmergencyServicesRoutingDigits IMPLICIT DigitsType	M	6.5.1.2	a
Length	variable octets	M	6.5.1.1	
Contents				

H	G	F	E	D	C	B	A	octet	Notes
Type of Digits								1	b
Nature of Number								2	c
Numbering Plan				Encoding				3	d, e
Number of Digits								4	f
2nd BCD Digit				1st BCD Digit				5	
4th BCD Digit				3rd BCD Digit				6	
• • •				• • •				• • •	
*n*th BCD Digit				*n*-1st BCD Digit				*m*	

Figure XX EmergencyServicesRoutingDigits parameter for BCD digits

Notes:

a. Refer to the DigitsType parameter type (see 6.5.3.2) for notes and field encoding.

b. The Type of Digits field is ignored on receipt.

c. The Nature of Number field is set as applicable.

d. The Numbering Plan field is set to *Telephony Numbering*.

e. The Encoding field is set to *BCD*.

f. The Number of Digits is between 0 and at least 15.

6.5.2.97 Profile

The Profile is a collection of the subscriber's calling profile information. This information is a list of optional parameters. The Profile macro has been defined solely for editorial convenience, and does not affect the encoding in any way.

PROFILE			
	Type	Reference	Notes
Contents			
AuthenticationCapability	O	6.5.2.8	a
CallingFeaturesIndicator	O	6.5.2.20	b
CarrierDigits	O	6.5.2.28	c
DMH_AccountCodeDigits	O	6.5.2.59	d
DMH_AlternateBillingDigits	O	6.5.2.60	d
DMH_BillingDigits	O	6.5.2.61	d
GeographicAuthorization	O	6.5.2.68	e
MessageWaitingNotificationCount	O	6.5.2.78	f
MessageWaitingNotificationType	O	6.5.2.79	g
MobileDirectoryNumber	O	6.5.2.80	d,t
OriginationIndicator	O	6.5.2.89	h
OriginationTriggers	O	6.5.2.90	i
PACAIndicator	O	6.5.2.91	j
PreferredLanguageIndicator	O	6.5.2.96	k
RestrictionDigits	O	6.5.2.113	l
RoutingDigits	O	6.5.2.114	m
SMS_OriginationRestrictions	O	6.5.2.136	n
SMS_TerminationRestrictions	O	6.5.2.138	o
SPINIPIN	O	6.5.2.139	p
SPINITriggers	O	6.5.2.140	q
TerminationRestrictionCode	O	6.5.2.157	r
TerminationTriggers	O	6.5.2.159	s

Notes:

a. Include on *IS-41-C* or later.

b. Include to identify feature authorization and activity.

c. Include if preferred carrier is applicable and TransactionCapability supported.

d. Include if available for recording purposes (see *DMH*).

e. Include if available for certain authorization restricted areas.

f. Include if MessageWaitingNotificationType is *Message Waiting Indication* and number of messages waiting is authorized.

g. Include if Message Waiting Notification feature is active and a message is waiting.

h. Include to indicate the type of calls allowed for origination service.

i. Include to indicate OriginationRequest triggers.

j. Include to identify the PACA feature.

k. Include to identify the Preferred Language feature.

l. Include if originations are restricted to NPA-NXX or NPA-NXX-XXXX and TransactionCapability supported.

m. Include for special routing information.

n. Include for MS originated Short Message Service.

o. Include for MS terminated Short Message Service.

p. Include if local SPINI operation supported.

q. Include to indicate Subscriber PIN Intercept triggers.

r. Include to indicate the type of call termination service.

s. Include to indicate the RedirectionRequest or TransferToNumberRequest triggers.

t. Include if available for Emergency Services Callback purposes.